sPHENIX Infrastructure

Director's Cost and Schedule Review
November 9-10, 2015
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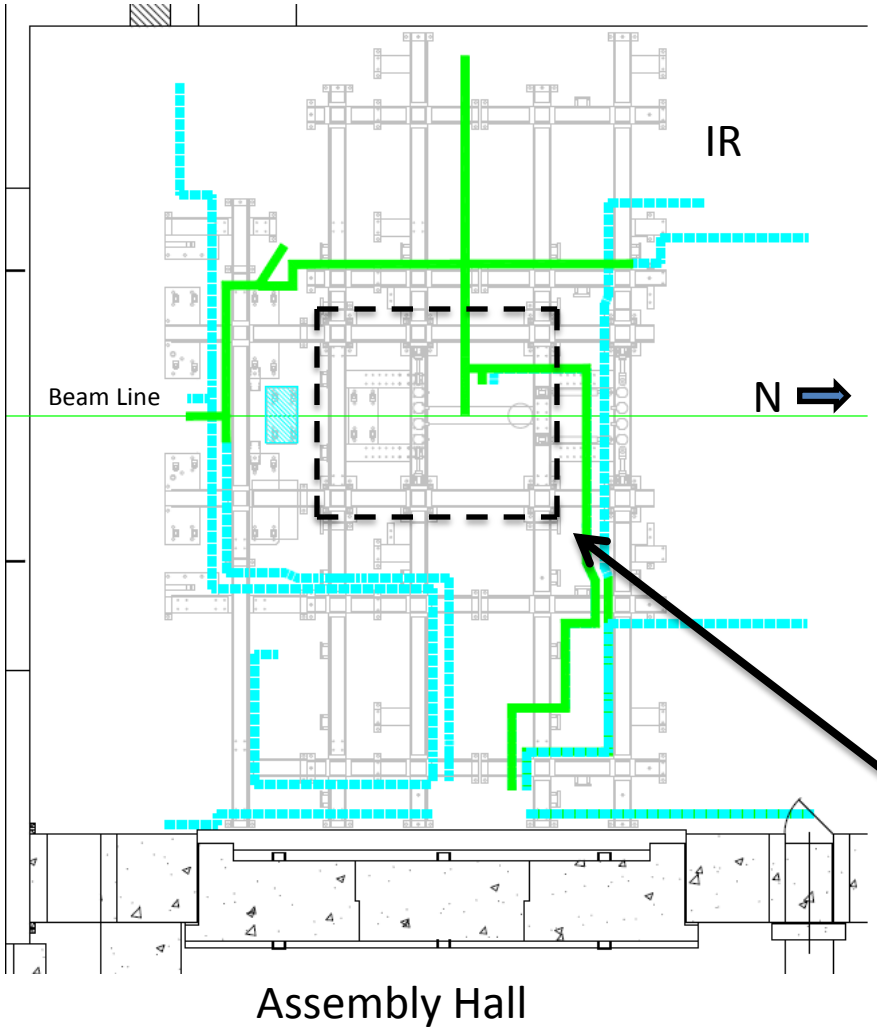
Infrastructure Outline

- Track Design showing the following services
  - IR Cables and Piping Routes
    - AC Power Cables and Associated Trays
    - Control, Signal, and Fiber Optic Cables and Associated Trays
    - Electronic Racks Cooling Water Headers
- IR HVAC Air Handlers and Condensers
- Safety Monitoring and Control System (SMCS)
- Detector Access

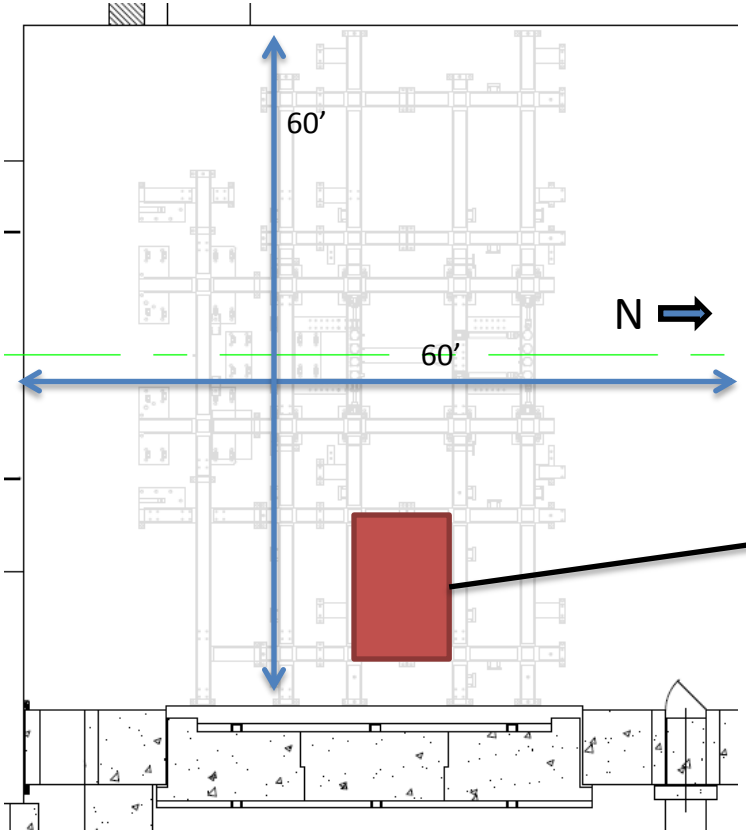
IR Power and signal trays

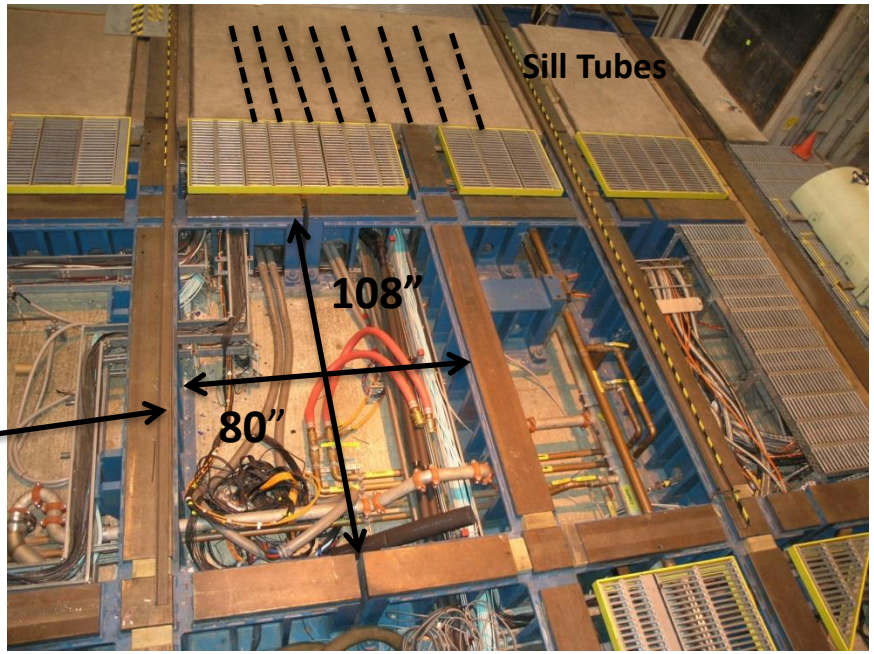


- Existing configuration uses heavy duty 6” wide steel galvanized tray.
- Blue and Green show upper and lower tiers.
- Upper tier is signal, lower tier is power.

Approximate sPhenix Footprint (main pedestal)

Typical track services detail





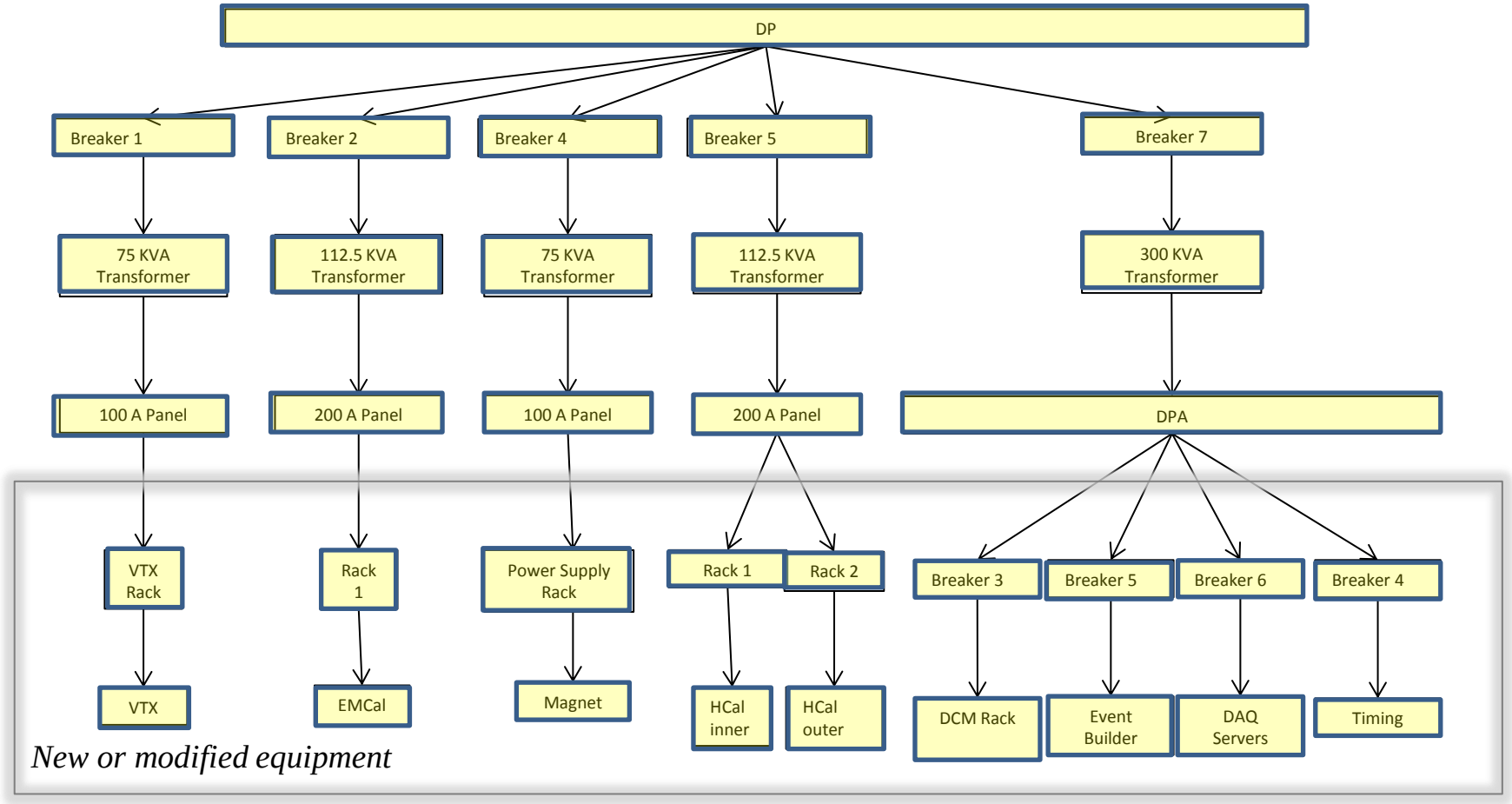
Current routing of IR services

Through Sill Only (other services run via backyard and North & South Tunnels)

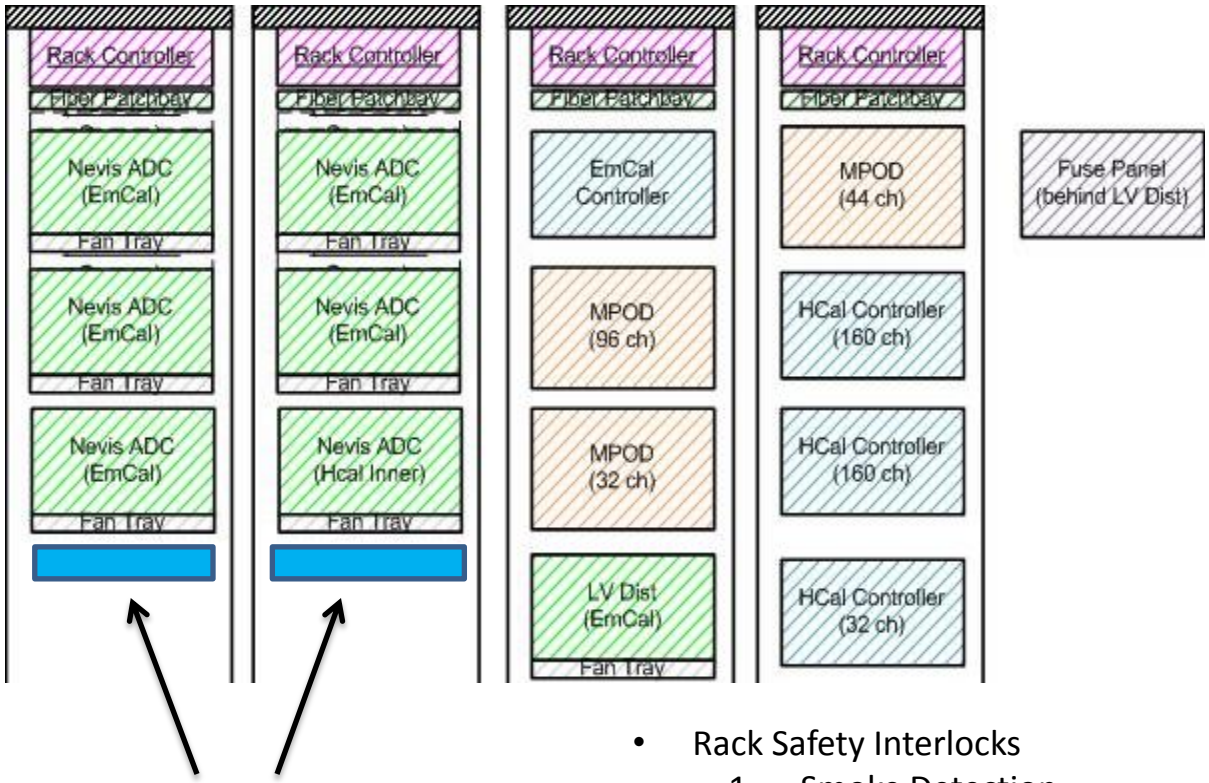
- 30 total 4” diameter PVC pipes (Sill Tubes)
- 377 sq. inches of available space

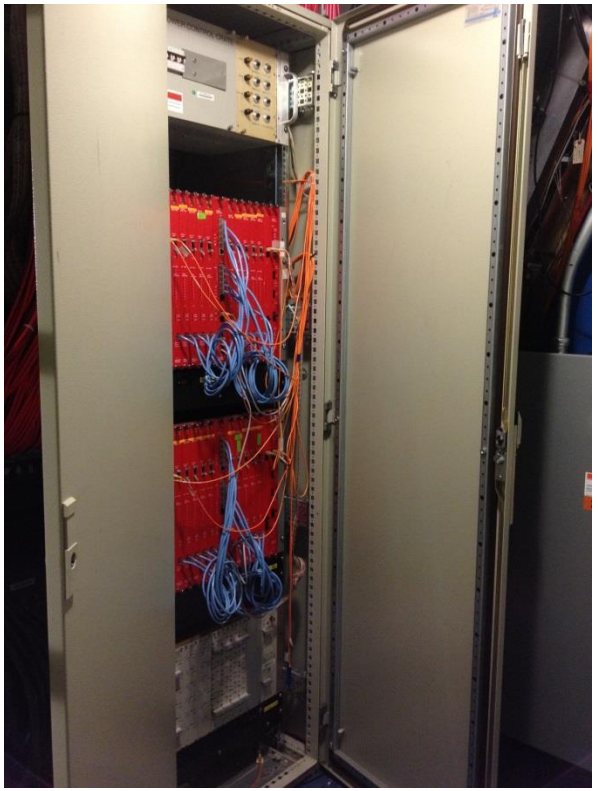
AC Line Electric Power Distribution

AC line electrical power distribution utilizes existing power distribution
Magnet power effort is being handled by super conducting magnet group



Racks, rack generic requirements





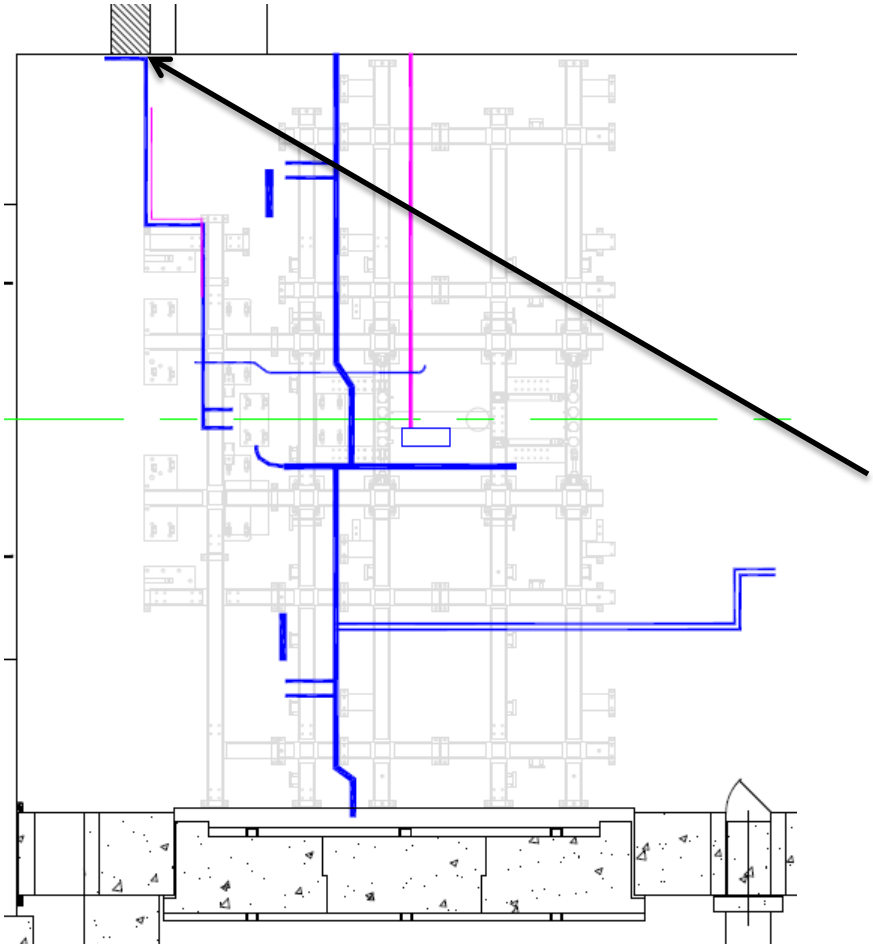
Water Cooled Heat Exchangers

- Power Requirements
  1. One 30A 208V AC Feeder Breaker

- Rack Safety Interlocks
  1. Smoke Detection
  2. Over Temp. Detection
  3. Water Leak Detection

Approximately 25 Total Racks needed; More than 50 available from PHENIX

Cooling Water Piping

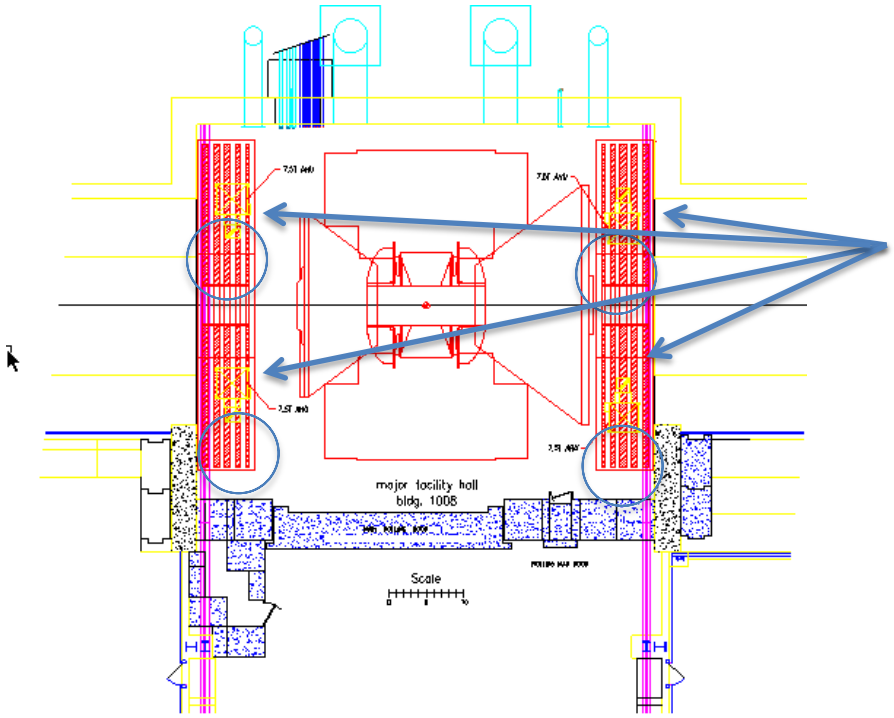


Fed from Building 1008B (backyard)

- Electronics Cooling Water Piping remains
- Magnet Cooling Water Piping to be removed

IR HVAC

- Plan to use existing existing 4 HVAC units infrastructure
- We have done well with a periodic maintenance schedule, which has increased the systems overall reliability
- 4 condensers located outdoors on IR roof



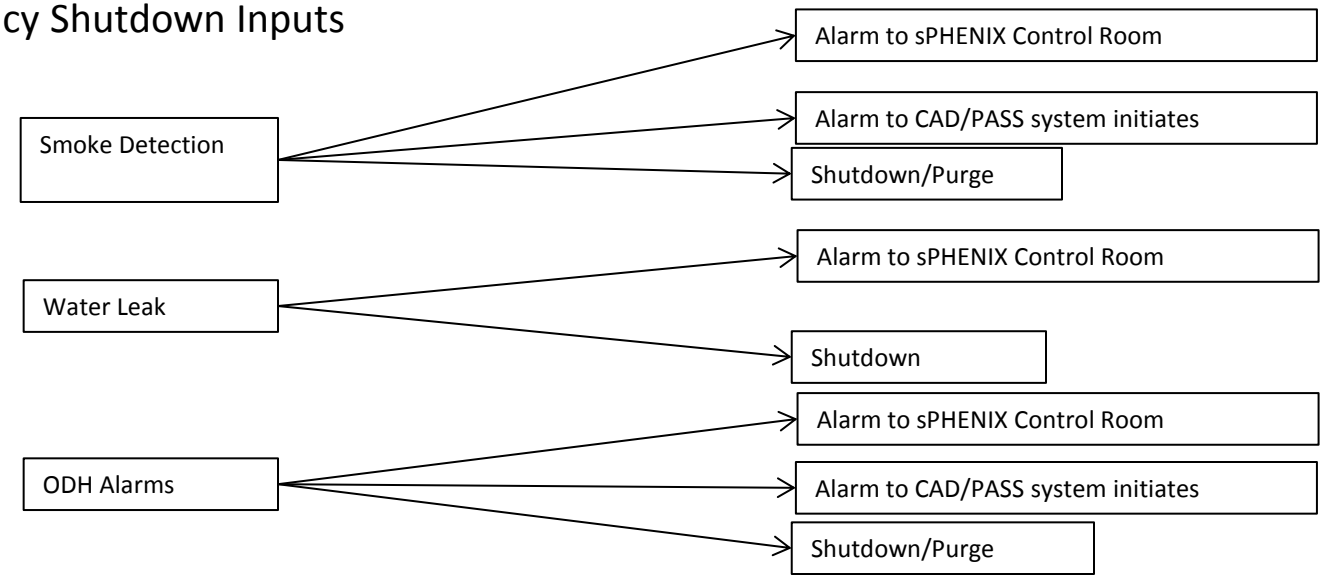
4 air handlers in IR
on top of MuID Steel

Safety System Sample Logic

Existing Infrastructure Changes

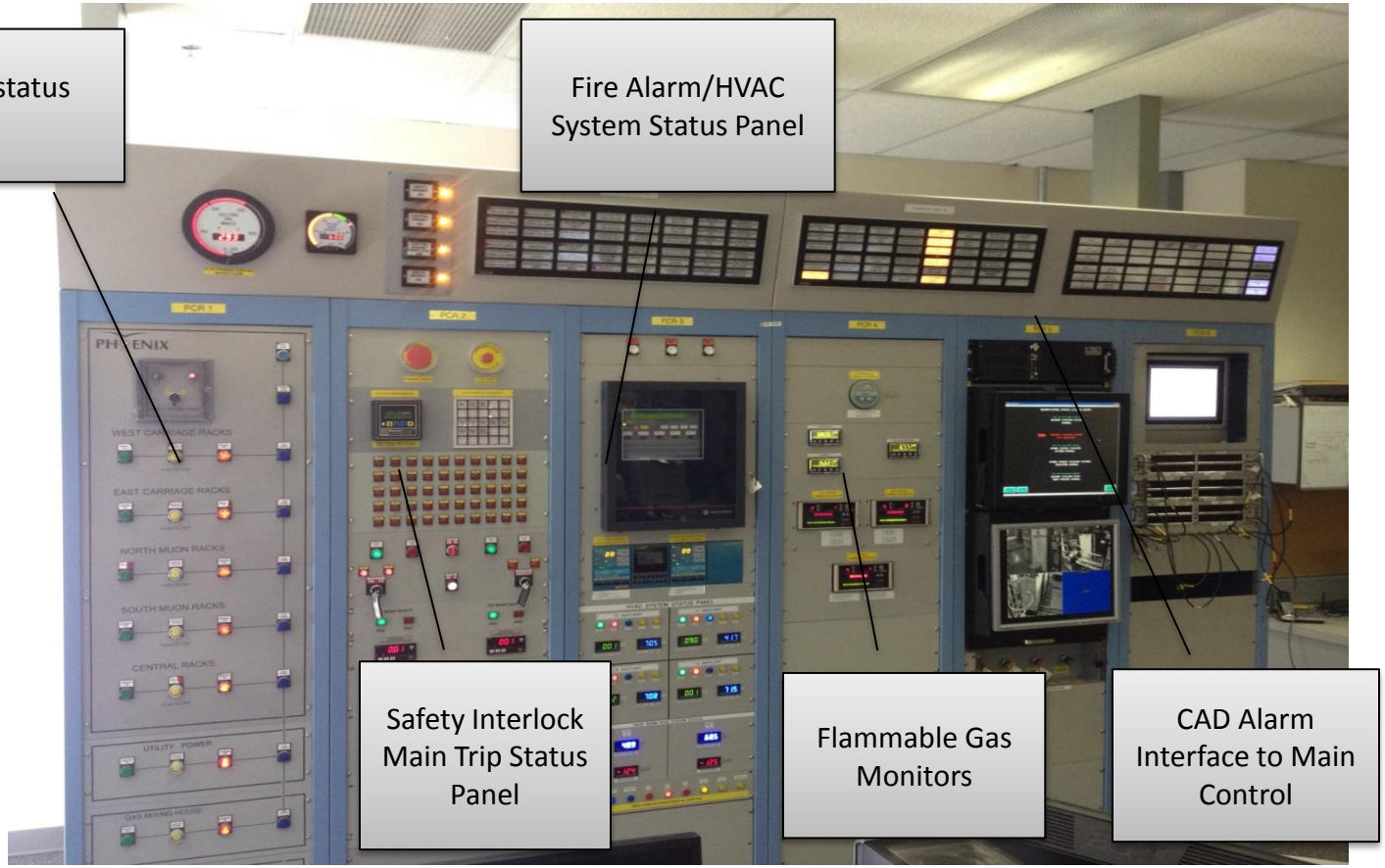
- Remove flammable gas detectors
- Trip Logic to Remain Relay Based
- PHENIX Control Room upgrade for ODH sensors and monitoring
- CAD PASS system upgrade due to use of He in IR

Emergency Shutdown Inputs



Safety Monitoring & Control System (SMCS)

Safety subsystems make maximum use of existing equipment for fire detection/suppression, HSSD, water leak detection, flammable/hazardous gas detection, PASS system; new ODH which will utilize large existing exhaust fans (20 air changes per hour)



PHENIX Control Room

Detector Access

- Plan to retain access (permanent ladders, stairs, platforms) for all 4 corners of IR and North East tower. North crossover may be modified to bridge between North East tower and Central Pedestal upper platform.

Upper Platform

North Tower

Issues & Concerns

- Determine the Following
  - All subsystem cabling requirements
    - Signal, Power, & Fiber
  - Total number of electronics racks
  - Total Cooling Water Capacity (GPM)
  - Perform ODH Calculation
    - Number of Sensors in IR
    - SMCS Response